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## A new bee from central Asia: *Systropha heinzi* sp. n.

(Hymenoptera, Apoidea, Halictidae)

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### Abstract

*Systropha heinzi* sp. n. from southern Kazakhstan is described. It is most similar to *Systropha iranica* POPOV 1967, from which it can easily be distinguished by a distinct semicircular emargination of the apical margin of metasomal sternum 8 in the males, a unique feature within *Systropha*. Relevant morphological characters of the new species are figured by SEM.

### Introduction

The old world rophitine bee genus *Systropha* ILLIGER shows a mainly palaearctic and ethiopian distribution, with a few species occurring in the oriental region (BAKER, 1996; BATRA & MICHENER, 1966; EBMER, 1994). With 24 described species (12 palaearctic, 8 ethiopian, 4 oriental) according to BAKER (1996) and EBMER (1994) it represents the second largest genus in the Rophitinae (MICHENER, 2000). The most characteristic features of *Systropha* are found in the males like the apically curled antenna which is often accompanied by a reduction in flagellar width or a conspicuously small head which is distinctly narrower than the thorax. Another remarkable feature is the number of antennal segments in the male. It varies from 11 to 13, depending on the species (BAKER, 1996; BATRA & MICHENER, 1966, MICHENER, 2000). Presumably all species of *Systropha* are specialists on *Convolvulus*. Large amounts of pollen are carried by the females mainly in the plumose scopal hairs of the whole metasoma as documented in WESTRICH (1989) and MÜLLER et al. (1997) in addition to scopal hairs of hind legs.

The author came across several specimens of the new species of *Systropha* from southern Kazakhstan when examining the many undetermined bees in the collection of Dr. R. W. GRÜNWALDT in the Zoologische Staatssammlung München (ZSM).

### Methods and material

The specimens were photographed by scanning electron microscopy (SEM) using a Philips XL 20 SEM. Pinned and air-dried specimens were fixed with Leit-C-Plast on a object table and analyzed by 1.6 kV using a special low voltage anode (spot 4, integrate 1 or 4, slow scan 3). Hidden sterna and genitalia of the males were dissected from the metasoma and cleared in 10 % KOH for about 3 h. After washing with distilled water they were put in ethanol (75 %) and transferred to solutions of acetone (75 %, 85 %, 90 %, 95 % and 99 % for 10 min each). Stored in 100 % acetone for 24 h, the samples were critical point dried with a BAL-TEC CPD 030 critical point dryer and sputtered for 120 sec. with a Polaron SEM coating system. Structures prepared this manner were analyzed by SEM using a conventional high voltage anode at 10 kV (spot 4.5, integrate 1, slow scan 3).

Material examined. Specimens of the following palaearctic species of *Systropha* in the Biologiezentrum des Oberösterreichischen Landesmuseums, Linz (OLL), the ZSM and the collection of the author (CAD) were studied and compared to the new species: *S. hirsuta* SPINOLA 1838, *S. pici* PÉREZ 1895, *S. christae* WARNCKE 1992, *S. popovi* PONOMAREVA 1967, *S. iranica* POPOV 1967, *S. planidens* GIRAUD 1861, *S. curvicornis* (SCOPOLI 1770), *S. maroccana* WARNCKE 1976 and *S. tadjika* WARNCKE 1992. According to BAKER (1996) *S. hirsuta* and *S. christae* are to be regarded

as synonyms, furthermore *S. hirsuta* sensu WARNCKE (1976, 1980) and sensu PONOMAREVA (1967) is to be considered as *S. pici*.

Following abbreviations are used throughout the text: AS: antennal segment; BL: body length; FWL: length of forewing; GS: gonostylus; L/W: length/width quotient of antennal segment; S: metasomal sternum; T: metasomal tergum. The degree of cuticular surface punctuation is measured by the distance between single depressions relative to their diameters. Thus punctuation is considered sparse/dense when the distance between the depressions is as wide as, or greater/less than the diameter of a single depression. Usage of morphological terminology follows MICHENER (2000).

### *Systropha heinzi* sp. n.

**Type material:** Holotype: ♂, southern Kazakhstan, Turkestan, 24.V.1998, leg. S. OVTSCHINNIKOV, ex coll. GRÜN-WALDT (ZSM). Paratypes: 21♂, 1♀, same data as holotype (ZSM, CAD).

#### Description

**Male.** BL: 9.5-12.8 mm. FWL: 7-8.6 mm.

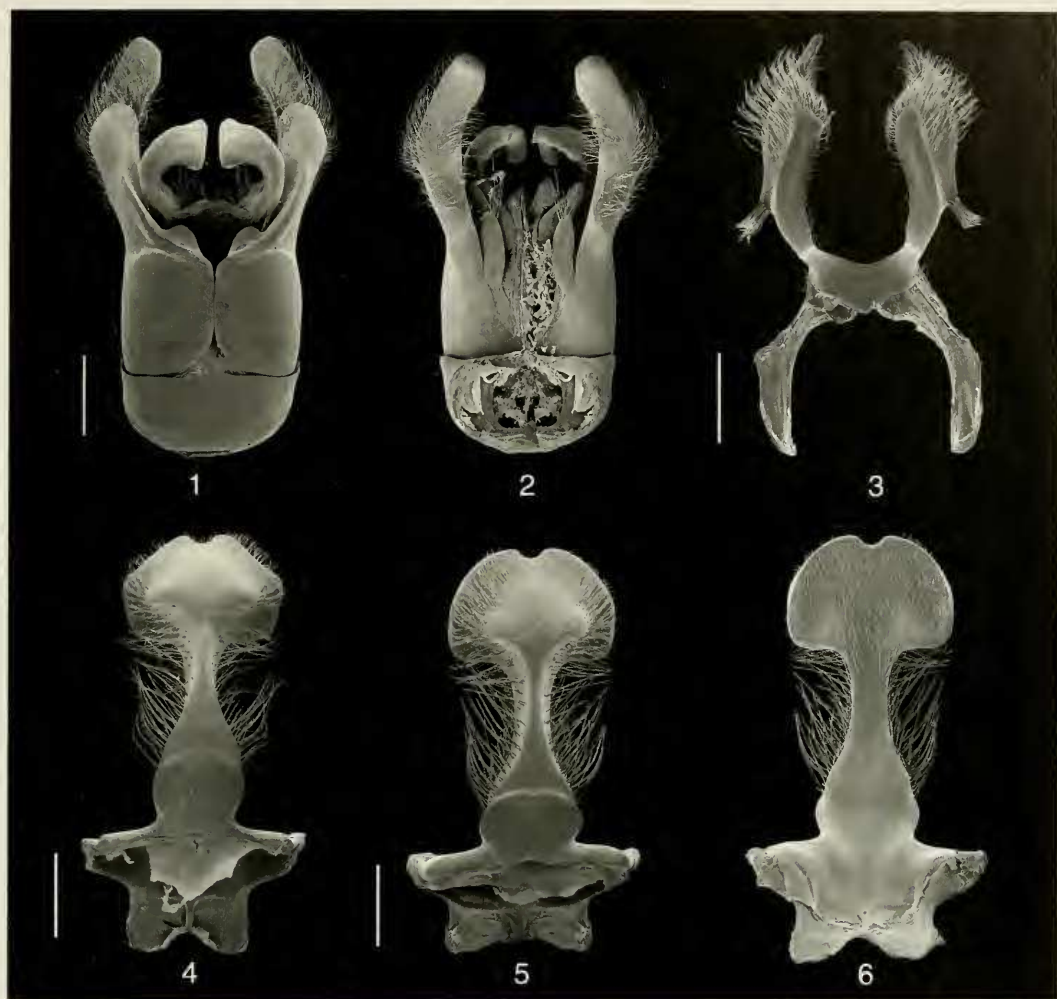
Structure: Head slightly broader (1.2 times) than long in frontal view. Galea weakly shiny with minute dense punctuation. Labrum smooth and shiny, without distinct punctuation. Clypeus with coarse irregular honeycomb punctuation, dull (basally) to shiny (apically). Other parts of head smooth to weakly tessellate, shiny with dense punctuation (<1). Genal area about as wide as compound eye in lateral view. Hind margin of vertex broadly rounded. Distance between hind margin of lateral ocellus to hind margin of vertex about 2.2 times as wide as diameter of lateral ocellus. Scape smooth and shiny with minute, dense punctuation, about 2.3 times longer than broad. AS 3 about 3.6 times as long as broad, 0.8 times as long as following two AS together. Length AS 4:5:6:7:8:9:10:11:12:13 = 1.0:1.1:1.2:1.2:1.4:1.7:1.6:1.5:1.3:1.1. L/W ratios of AS 4-13: 1.8; 1.7; 1.5; 1.4; 1.6; 2.7; 3.0; 4.3; 4.7; 6.0. Scutum smooth and shiny with distinct dense punctuation becoming increasing less dense from anterior to posterior margin. Scutellum smooth and shiny with irregular punctuation, which is particularly scattered on lateral humps. Metanotum, dull, finely wrinkled. Propodeal triangle finely wrinkled all over, except smooth and shiny area along hind margin. Lateral parts of dorsal propodeum with a dense and weakly honeycomb punctuation therefore dull to weakly shiny. T1-6 weakly tessellate with strong and dense punctuation (<1) on disc and weak, dispersed punctuation (>2) on marginal zone. Dorsolateral convexity of T1-6 strongly developed. Marginal zone of T1-2 about as long as disc, distinctly longer than disc on T3-6. T7 dull with irregular punctuation ranging from coarse (basally) to minute (apically). Apical margin of T7 straight to weakly rounded. S2 and 3 with cone-shaped paired projections distinctly larger on S2 than on S3 (Figs 7, 8). S6 with weak median carina on apical half. Apical margin of S6 with median emargination, with a distinct tooth-like projection in the middle (Fig. 7). Shape of S7 as shown in Fig. 3. Dorsal outline of apical part of S8 slightly angled (Fig. 4) to well-rounded (Fig. 5). This variation is caused by a dorsolateral lamella which is more or less prominently developed. Of the 22 males 20 show a more or less angled outline (similar to Fig. 4) while only two males show the strict well-rounded condition as in Fig. 5. Ventral S8 strongly flattened (Fig. 6). Apical margin of S8 with distinct semicircular emargination in the middle (Figs 4-6). Male genitalia as in Figs 1 and 2.

Integumental color: Black except the following structures: Ventral side of AS 4 with an apical yellowish brown spot. AS5-8 yellowish orange beneath, AS9-13 bright brown. Stigma of front wings with a bright yellowish transparency. Distal tarsal segments (2-5) brown. Claws brown basally, darkly reddened apically. All leg spurs with a yellowish gray transparency. Marginal zone of T with a dark brownish transparency.

Pubescence: Head and thorax with silvery white hairs conspicuously long on lower part of frons, vertex, genal area and dorsal parts of thorax (scutum, scutellum and metanotum). Legs with silvery white hairs of varying length. Labrum apically with short yellowish gray pubescence, forming distinct hair fringe along apical margin. Pubescence of T1-7 silvery white with long hairs basally, and medium long dispersed hairs on marginal zone. S with sparse whitish pubescence of extremely short (disc) to medium long hairs (laterally).

**Female.** BL: 9.7 mm. FWL: 7.0 mm.

Structure: Shape and structure of head similar to male except the following: Scape more slender than in male, 3 times as long as broad. AS3 short, slightly longer than following two AS together. AS4-11 distinctly



Figs 1-6. Genitalia (1,2), S7 (3) and S8 (4-6) of *Systrophla heinzi* sp. n. (male); 1,3-5, dorsal view; 2,6, ventral view. Scale bars: 250  $\mu$ m.

broader than long, AS13 nearly as long as broad, L/W ratios of AS 4-12: 0.8; 0.5; 0.6; 0.6; 0.5; 0.5; 0.6; 0.5; 0.9. Length AS 4:5:6:7:8:9:10:11:12 = 1.0:0.8:1.1:1.1:1.3:1.3:1.4:1.3:2.3. Thorax similar to male. Disc of T1-5 with punctuation similar to that in male, but more strongly tessellate. Marginal zone of T1-4 more strongly tessellate than in male with inconspicuously weak and scattered punctuation. Marginal zone of T1-3 distinctly shorter (0.7 times) than disc, about as long as disc on T4 and 5. Dorsolateral convexity of T1-4 well-developed but less so in male. Pygidial plate crenulate, dull, about as broad as AS5. S1-6 strongly tessellate with indistinct wrinkle-like punctuation. Apical margin of S2-4 straight, of S5 broadly concave. S6 triangular.

Integumental color: Black except the following structures: Ventral side of AS4 and 5 dark brown, AS6-12 bright brown beneath. Stigma of front wings with a bright yellowish transparency. Distal tarsal segments (2-5) dark brown. Claws yellowish brown basally, darkly reddened apically. Spurs of all legs with a yellowish gray transparency. Marginal zone of T bright with a yellowish brown transparency.

Pubescence: Head and thorax with similar pubescence as in male but distinctly shorter, especially on frons, vertex and dorsal parts of thorax. Legs with silvery white to yellowish white hairs of varying length. Pubescence of T1-4 yellowish white to grayish white of short to medium long hairs which are rather sparse





Figs 7-8. *Systrophia heinzi* sp. n. (male); 7, ventral view of metasoma; 8, projections of S2 and 3.

on marginal zone. Prepygidial fimbria on marginal zone of T5 as well as pygidial fimbria (T6) conspicuously orange. Pubescence of S1-6 yellowish white with short (S6) to medium long (S1-5) hairs.

**Diagnosis:** *Systrophia heinzi* sp. n. is most similar to *Systrophia iranica* POPOV from which it can be clearly distinguished by the following characters (characters states of *S. iranica* in parentheses): AS4-13 of males yellowish brown to orange beneath, bright brown dorsally (dark brown beneath, black dorsally); disc of scutum and scutellum of both sexes with more scattered punctation ( $\geq 1$ ) distinctly shining (with a weakly honeycomb punctation, dull to weakly shining); propodeal triangle of both sexes granulate with smooth surrounding margin (minutely wrinkled, without smooth margin); marginal zone of T of males nearly polished, distinctly shiny (strongly tessellate, dull); prepygidial and pygidial fimbria of females bright orange (yellowish gray); paired projections of S2 of males apically flattened, rectangular without sharp edges as in Figs 7, 8 (apically pointed, not flattened, and tooth-like); S6 of males with weak preapical hump along median carina, as in Fig. 7 (preapical tooth well-developed); apical margin of S8 of males with distinct semicircular emargination medially (Figs 4-6), which is a unique feature within *Systrophia* (apical margin of S8 convex rounded, without emargination).

**Etymology:** The new species is named in honor of my beloved father Heinz DUBITZKY, who has provided great support for me throughout the duration of my studies.

### Acknowledgments

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### Zusammenfassung

*Systrophia heinzi* sp. n., eine neue Spiralhornbienenart aus Süd-Kasachstan wird beschrieben. Die neue Art ist *Systrophia iranica* POPOV 1967 am ähnlichsten, unterscheidet sich jedoch deutlich von dieser durch eine halbkreisförmige Ausrandung am Ende des 8. Abdominalsternites der Männchen, einem innerhalb der Gattung *Systrophia* einzigartigen Merkmal. Die wichtigsten morphologischen Merkmale der neuen Art werden rasterelektronenmikroskopisch dokumentiert.

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